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IN THE US PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: Drucker

Application No: 09/195,728

For: View Dependent Tiled Textures

Group Art Unit: 2672

Filed: November 18, 1998

Examiner: Yang, Ryan R.

Attorney Docket No.
1026-006/MMM 112375.01

APPELLANT'S BRIEF (37 CFR 1.192)

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This brief is in furtherance of the Notice of Appeal filed April 29, 2003, in connection with the captioned application. The $320 fee required under 37 CFR 1.17(c) is enclosed herewith. A two-month extension of the period for filing this brief is requested.

This brief is transmitted in triplicate.

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Mark M. Meininger

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1. Real Party in Interest

The real party in interest is Microsoft Corporation, Redmond, Washington.

2. Related Appeals and Interferences

There are no related appeals or interferences.

3. Status of Claims

Claim 37 is allowed.

Claims 1-36, 38, and 39 are the claims on appeal and pending in the application.

4. Status of Amendments

No amendment was filed after the April 5, 2002 final rejection.

5. Summary of the Invention

In computer graphics, texture mapping refers to adding texture, color, shading, illumination, transparency, as well as other image attributes, to the surface of an image geometry to increase the detail and realism in an image. In this context, image geometry refers to an image surface to be rendered on a video display and is not a limited to image objects representing solid articles. Commonly, texture mapping utilizes a texture tile (or tiled texture) that includes the image attributes of the texture and is typically smaller than the image geometry to which the texture mapping is applied. As a result, texture mapping often entails applying an array of many copies of the texture tile to the image geometry (i.e., tiling) to cover it with the image or surface texture. Texture mapping simplifies image processing by allowing image modeling calculations to be based on image geometries alone without also having to model relatively high resolution and complex surface details.

Conventional tiled textures and texture mapping suffers from relatively poor depth characteristics and therefore lacks realism. An example of a common tiled texture that commonly suffers from these disadvantages is a tiled texture representing a brick wall. An actual brick wall is characterized by rich three-dimensional structures in which adjacent bricks are separated by mortar. Typically, the mortar in an actual brick wall is

recessed (or projects outward) relative to the front major faces of the bricks. When viewed from most angles, the relative depths of the brick faces and mortar are plainly discernible.

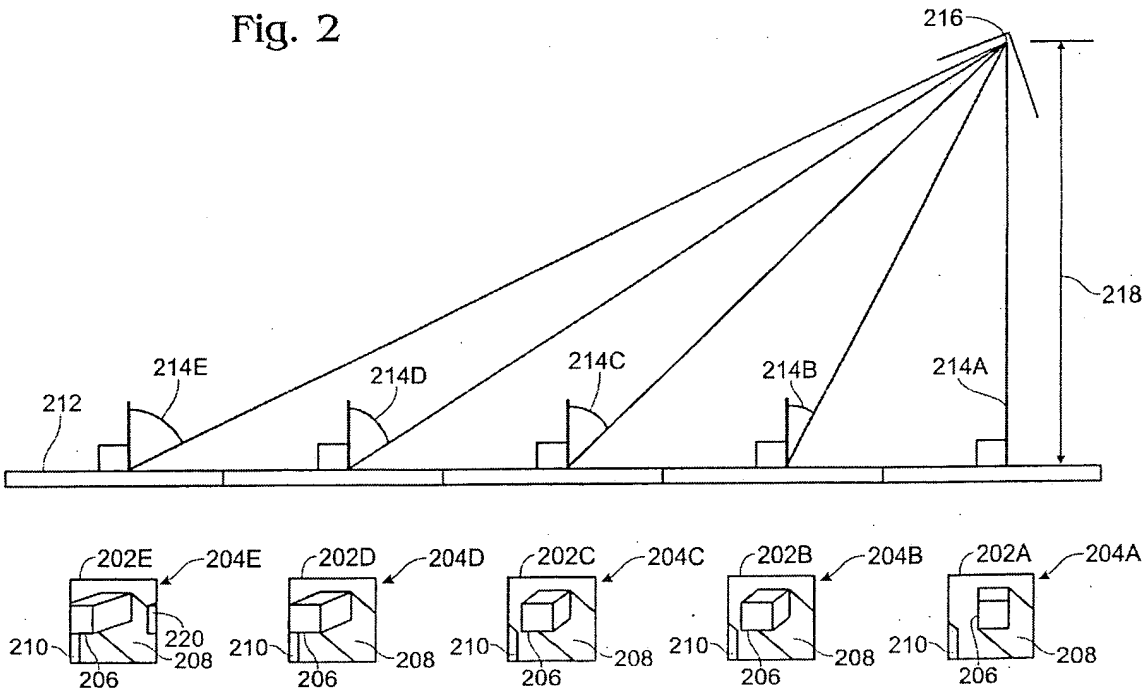
Texture mapping is the general process of wrapping an image around a geometry and rendering the results. A conventional tiled texture is a single tile that is rendered repeatedly in an array to form an image. In conventional texture mapping for computer graphics, however, the depth characteristics of the typical tiled texture of a brick wall, for example, are lacking. In this example, the tile may be of a single brick or, more likely, is of a group of bricks mortared together. The tile may include apparent depth characteristics between the mortar and bricks included in the tile. Even with apparent depth characteristics of such a tile, such texture mappings look like printed wall paper rather than a three-dimensional structure.

In accordance with the present invention, the absence of the apparent depth in texture mappings may be averted by employing an array of view-dependent sprited tiles that provide different views of an image texture (e.g., structure, color, shading, illumination, transparency, as well as other image attributes). The different views of the image texture correspond to different viewing angles at which a user would see tiles when they are applied to an image geometry. In one implementation, the viewing angles are based upon the horizontal angles (i.e., angles within a horizontal plane of a user's view) at which the user views the tiles. This implementation is considered to be view dependent in one (angular) dimension or, alternatively, a one-dimensional array of sprited tiles. Tiles in accordance with this invention can also be based upon other single angular dimensions (e.g., vertical and others) or multiple (e.g., two) viewing angle dimensions.

In one implementation, the view dependent sprited tiles are two-dimensional projections of three-dimensional structures. Fig. 2 (reproduced below) is an illustration of an exemplary array of view-dependent sprited tiles 202A-202E having respective textures 204A-204E that are of a simplified texture structure in the form of a solid block 206 having a front or outer surface 207 and casting a shadow 208. Front surface 207 is the generally major surface of block 206 in tiles 202. Shadow 208 represents the result of an illumination source (not shown) that enhances the representation of textures 204, as is

common in the field of texture mapping. Shadow 208 extends beyond each of tiles 202 and is represented by a shadow segment 210 on each adjacent tile 202. In a texture mapping, sprited tiles 202 are applied to a surface of an image geometry to increase the detail and dynamic realism in an image rendered for a user on a display screen 212 (shown on edge). Tiles 202 are shown perpendicular to the plane of display screen 212 for purposes of illustration.

Fig. 2

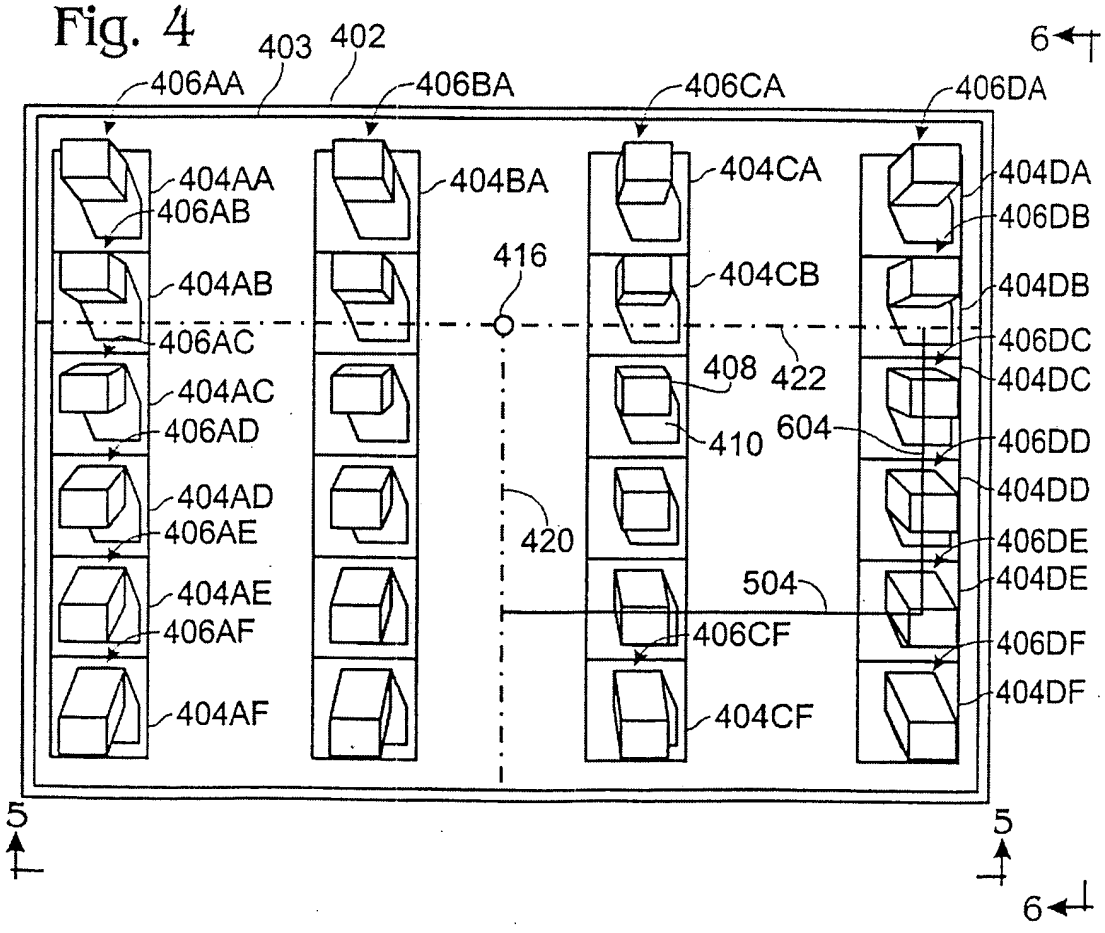


Sprited tiles 202A-202E provide different views of the geometry of texture structure block 206 in respective textures 204A-204E. The different views of block 206 correspond to different viewing angles 214A-214E at which a user would see tiles 202 when they are applied to an image geometry. In this example, tiles 202 are two-dimensional projections of three-dimensional structures. Viewing angles 214 are determined with respect to a selected user viewpoint 216 that is assigned a preselected

distance 218 from display screen 212. At the relatively large viewing angle 214D of tile 202D, for example, tile 202E includes a texture block segment 220 representing a partial overlap of texture structure 206 from adjacent tile 202D.

Fig. 4 (reproduced below) is a front view illustration of a display screen 402 having rendered thereon an image surface 403 with an exemplary two-dimensional array of view-dependent sprited tiles 404AA-404DF having respective textures 406AA-406DF that are of a simplified structure in the form of a solid block 408 (only one numbered) casting a shadow 410 (only one numbered). Shadow 410 represents the result of an illumination source (not shown) that enhances the representation of textures 406, as is common in the field of texture mapping.

Fig. 4



6. Issues

a. Whether Claims 1-36, 38, and 39 Were Properly Rejected Under 35 USC § 112, first paragraph.

7. Grouping of Claims

Claims 1-36, 38, and 39 stand rejected under 35 USC § 112, first paragraph, as containing subject matter that was not described in the specification in such a way that one skilled in the art had possession of the invention at the time the application was filed.

Claims 1-36, 38, and 39 stand or fall together.

8. Argument

a. The Rejection of Claims 1-36, 38, and 39 Under 35 USC § 112, first paragraph, Should be Reversed

The Prosecution History

Original claims 1-39 were rejected under 35 USC 103(a) for obviousness over Strandberg (US Pat. No. 6,054,999) in a first office action dated January 23, 2001. In an amendment mailed May 23, 2001, claim 1 was amended as follows:

> 1. (Amended) A computer-readable medium having stored thereon a tile data structure for a tile representing an image texture for tiled texture mapping, comprising:
>
> plural tile data structures representing plural respective views of the image texture rendered simultaneously on a display screen immediately adjacent each other.

The remaining independent claims were amended similarly, and claims 40-42 were added. Claims 1-39, as amended, were allowed in an office action dated July 5, 2001, and added claims 40-42 were rejected over Strandberg (US Pat. No. 6,054,999).

In an amendment mailed August 27, 2001 with a Request for Continued Examination, claim 40 was amended as follows:

> 40. (Amended) A computer method of applying a texture map to an image surface in a graphics image rendered on a computer display screen, comprising:
>
> identifying a region of the image surface to which region the texture map is to be applied;
>
> determining a viewing angle for the region, the viewing angle being determined with respect to a selected user viewpoint;

correlating the viewing angle with a texture map tile corresponding to the viewing angle; and

rendering the texture map tile at the region on the computer display screen.

Rejected claims 41 and 42 were amended similarly. In an office action dated October 26, 2001, claims 40-42 were rejected for obviousness over Sakaibara et al. (US Pat. No. 5,786,822). The previous rejection of claims 40-42 over Strandberg was withdrawn, and claims 1-39 were again allowed. Claims 40-42 were cancelled in an amendment mailed January 8, 2002.

In an office action dated February 27, 2002, claims 1-33 were rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way to show that the inventors had possession of the claimed invention at the time the application was filed. The rejection was directed to the subject matter incorporated into the claims in the amendment dated May 23, 2001. The rejection reversed two prior indications of allowability of the claims in office actions dated July 5, 2001 and October 26, 2001.

An amendment filed October 3, 2002 rewrote allowable claim 37 in independent form and included a traversal of the rejection under 35 U.S.C. 112, first paragraph. In the office action dated October 25, 2002, claim 37 was allowed and the rejection under 35 U.S.C. 112, first paragraph, was made final. In response to the final rejection, the Notice of this Appeal was filed.

The Rejection

Claims 1-36, 38, and 39 stand rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way to show that the inventors had possession of the claimed invention at the time the application was filed. This rejection is commonly referred to as a "written description" rejection.

The Examiner notes in the final office action that claim 1 recites the limitation "image texture rendered simultaneously on a display screen immediately adjacent each other" in texture mapping. The Examiner identifies similar features in the remaining

rejected independent claims 16, 27, and 34. The Examiner maintains the final rejection with the following remarks:

> The applicant argues "Figure 4 shows plural 'view-dependent sprited tiles 404M-404DF' that are rendered together (i.e., simultaneously) on display screen 402." This is not persuasive to overcome 35 U.S.C. 112, first paragraph rejection because the applicant uses Figure 4 to argue the tiles are rendered together. However, there is not mentioning (sic) in the specification that the tiles are rendered together. In addition, "rendered together" is not the same as "rendered simultaneously", for "simultaneous" has more stringent time requirement than "together".[1]

The following argument is directed to claim 1 and is similarly applicable to independent claims 16, 27, and 34, and their dependent claims, all of which stand or fall together.

The Rejection Is Improper And Should Be Reversed Because The Examiner Dismisses Drawings As Being Capable Of Providing A Written Description

The Examiner argues that drawings are incapable of meeting the written description requirement under 35 U.S.C. 112, first paragraph. The Examiner states that:

> "... the applicant uses Figure 4 to argue the tiles are rendered together. However, there is not mentioning (sic) in the specification that the tiles are rendered together."[2]

The Examiner dismisses consideration of application Fig. 4 in regard to the subject matter of the claims. Instead, the Examiner considers only the specification text. Appellants submit that the rejection is improper and should be reversed because the Examiner improperly dismisses consideration of the drawings as originally filed in determining whether the inventors were in possession of the claimed invention at the time the application was filed.

Case law and the MPEP make clear that drawings included in an application when it is filed must be considered to determine whether the inventors were in possession of a claimed invention under 35 USC 112, first paragraph:

> An applicant may show possession of an invention by disclosure of drawings or structural chemical formulas that are sufficiently detailed to show that applicant was in possession of the claimed invention as a whole. See, e.g., *Vas-Cath*, 935 F.2d at 1565, 19 USPQ2d at 1118 ("drawings alone may provide a 'written

[1] Final office action dated October 25, 2002.

[2] Final office action dated October 25, 2002.

description' of an invention as required by Sec. 112\"); *In re Wolfensperger*, 302 F.2d 950, 133 USPQ 537 (CCPA 1962) (the drawings of applicant's specification provided sufficient written descriptive support for the claim limitation at issue); *Autogiro Co. of America v. United States*, 384 F.2d 391, 398, 155 USPQ 697, 703 (Ct. Cl. 1967) ("In those instances where a visual representation can flesh out words, drawings may be used in the same manner and with the same limitations as the specification."); *Eli Lilly*, 119 F.3d at 1568, 43 USPQ2d at 1406 ("In claims involving chemical materials, generic formulae usually indicate with specificity what the generic claims encompass. One skilled in the art can distinguish such a formula from others and can identify many of the species that the claims encompass. Accordingly, such a formula is normally an adequate description of the claimed genus."). The description need only describe in detail that which is new or not conventional. See *Hybritech v. Monoclonal Antibodies*, 802 F.2d at 1384, 231 USPQ at 94; *Fonar Corp. v. General Electric Co.*, 107 F.3d at 1549, 41 USPQ2d at 1805 (source code description not required). This is equally true whether the claimed invention is directed to a product or a process.[3]

The Examiner explicitly dismissed consideration of application Fig. 4 in the face of this clear precedent. Appellants submit, therefore, that the rejection is improper and should be reversed because the Examiner failed to consider all of the application, including the drawings, in determining whether the claims meet the written description requirement under 35 U.S.C. 112, first paragraph.

The Rejection Is Improper And Should Be Reversed Because The Application As Filed Shows The Claimed Subject Matter

Claim 1 as amended recites:

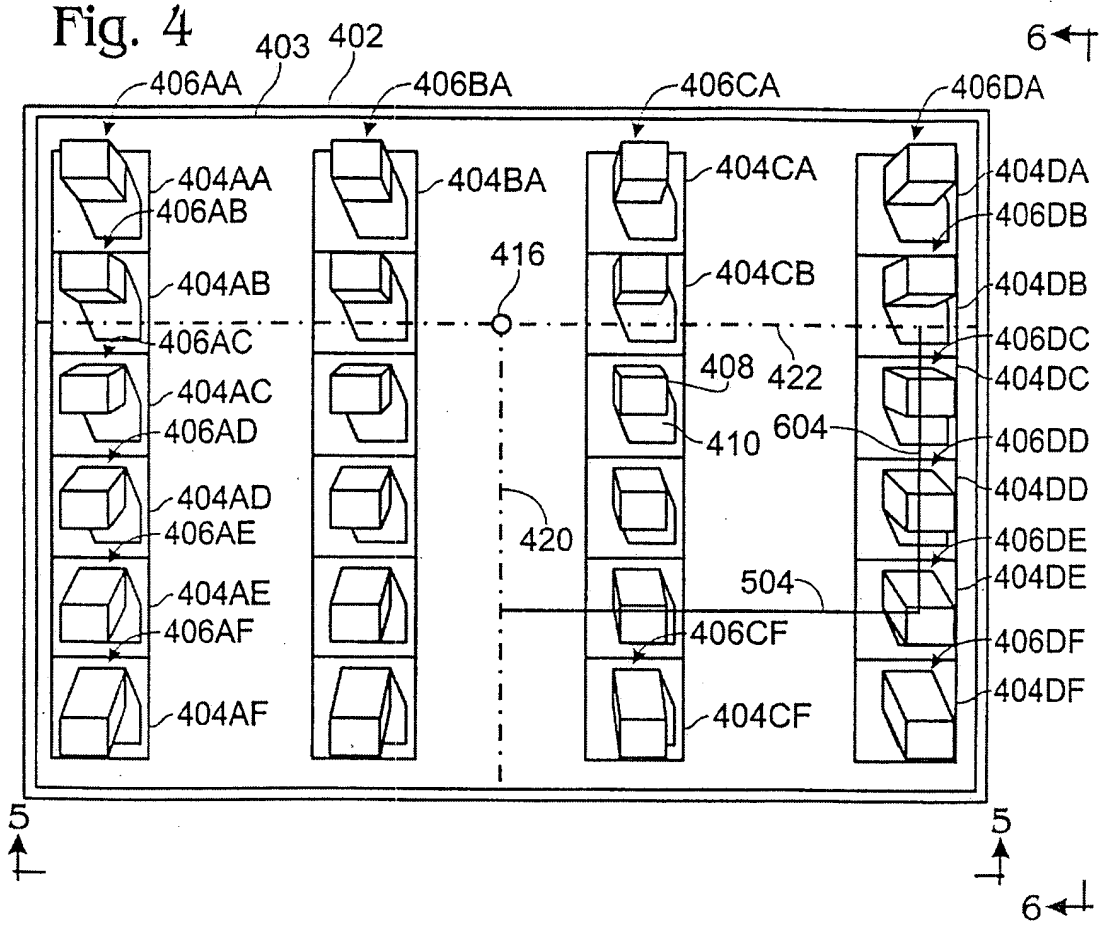
> 1. (Amended) A computer-readable medium having stored thereon a tile data structure for a tile representing an image texture for tiled texture mapping, comprising:
>
> plural tile data structures representing plural respective views of the image texture rendered simultaneously on a display screen immediately adjacent each other.

Fig. 4 of the application is summarized as "a front view illustration of a display screen having rendered thereon an exemplary two-dimensional array of view-dependent sprited

[3] MPEP 2163(II)(A)(3)(a).

tiles having respective textures that are of a simplified structure in the form of a solid block casting a shadow."[4] This display screen with its array of sprited tiles is shown as:

Fig. 4



As described in the application, Fig. 4 shows display screen 402 having rendered thereon an image surface 403 with an exemplary two-dimensional array of view-dependent sprited tiles 404AA-404DF having respective textures 406AA-406DF that are of a simplified structure in the form of a solid block 408 (only one numbered) casting a shadow 410 (only one numbered).[5] The sprited tiles 404AA-404DF provide different views of block 408 in respective textures 406AA-406DF. The different views of block

[4] Application page 4, lines 9-12.

[5] Application page 9, lines 6-13.

408 correspond to different horizontal viewing angles 412 and vertical viewing angles 414 at which the user can see tiles 404.[6]

Appellants submit that Fig. 4 and the associated description clearly disclose the cited subject matter of claim 1. Claim 1 recites "plural respective views of the image texture rendered simultaneously on a display screen immediately adjacent each other." Fig. 4 and its description unambiguously show plural "view-dependent sprited tiles 404AA-404DF" that are rendered on display screen 402. Fig. 4 and its description illustrate multiple "view-dependent sprited tiles 404AA-404DF" in the context of computer graphics texture mapping that is characterized in the application as follows:

> Whenever tiles formed by perspective or orthographic projections at different viewing angles are positioned together, image artifacts arising from inconsistencies in their views undermine the goal of improved depth characteristics.[7]

As in the passage above, the specification refers to texture mapping tiles being rendered together. Fig. 4 shows a display screen with texture mapping tiles that are rendered together. There is no hint that these references to texture mapping tiles are referring to anything other than tiles that are rendered together at a particular time. Appellants submit that the concept of things being together at a particular time is represented by the word "simultaneously."

In addition, the word "simultaneously" in claim 1 clarifies that the plural sprited tiles 404AA-404DF are rendered together, at the same time, as shown in Fig. 4. This clarifies a distinction of the present invention from the cited reference Sakaibara at al. (US Pat. No. 5,786,822), which is directed to rendering different views of an object at different times and positions. For example, Sakaibara et al. states that:

> In FIG. 13, a car 20 passes by an object 30. When the position of the car 20 moves from a position P1 to a position P4, an external view of the object 30 as viewed from the driver should change in accordance with the change of the car position. Accordingly, by changing the pattern of a portion of the object 30 displayed on the screen 80 of FIG. 12 in accordance with the position of the car

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[6] Application page 9, lines 23-26.

[7] Application page 3, lines 3-6.

> 20, the operator who manipulates the driving simulator is presented with higher feeling of reality.[8]

Due to the limitations of drawing a time sequential event, Fig. 13 shows in a single figure the car 20 at four different times. The recitation of "plural respective views of the image texture rendered simultaneously on a display screen immediately adjacent each other" clarifies the distinction of the subject matter of claim 1 from the time-sequential Fig. 13 in Sakaibara et al.

It will be appreciated that the clarification provided by the term "simultaneously" in claim 1 could equally have been provided by terms such as "at the same time" or "together in time." The Examiner apparently suggests that the term "together" would be supported by the application as filed:

> "In addition, 'rendered together' is not the same as 'rendered simultaneously', for 'simultaneous' has more stringent time requirement than 'together.'"

Appellants submit that the term "together" as used by the Examiner and supported by the application at Fig. 4 and page 3, lines 3-6 has the same meaning as the term "simultaneously" chosen by appellants to be in claim 1.

For the foregoing reasons, appellants submit that the subject matter of claim 1 is described in the specification in such a way to show that the inventors had possession of the claimed invention at the time the application was filed under 35 U.S.C. 112, first paragraph. Appellants submit, therefore, that the rejection of claims 1-36, 38, and 39 should be REVERSED.

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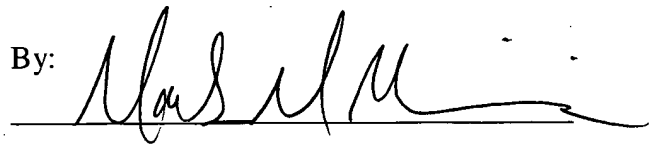
[8] Sakaibara et al., US Pat. No. 5,786,822, col. 2, lines 56-63.

9. Summary

In view of the foregoing, appellant submits that the Examiner's rejection of claims 1-36, 38, and 39 is improper, and reversal of all of the rejections is respectfully requested.

Respectfully submitted,

ipsolon llp

By: 

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10. Appendix A: The Claims Involved in the Appeal

1. A computer-readable medium having stored thereon a tile data structure for a tile representing an image texture for tiled texture mapping, comprising:

plural tile data structures representing plural respective views of the image texture rendered simultaneously on a display screen immediately adjacent each other.

2. The medium of claim 1 in which the plural respective views of the image texture are based upon oblique-parallel projections of the image texture.

3. The medium of claim 1 in which the plural respective views correspond to a range of user viewing angles that are rendered simultaneously on the display screen, each tile data structure corresponding to a segment in the range of user viewing angles.

4. The medium of claim 3 in which the segments in the range of user viewing angles are not equal.

5. The medium of claim 4 in which viewing angles are with respect to a predetermined reference and the segments closest to the predetermined reference are smaller that the segments farthest from the predetermined reference orientation.

6. The medium of claim 3 in which the segments in the range of user viewing angles are equal.

7. The medium of claim 3 in which the range of viewing angles extends over viewing angles of positive and negative magnitudes relative to a viewpoint position.

8. The medium of claim 7 in which the segments of viewing angles of positive magnitudes to which tile data structures correspond are matched one-to-one with the segments of viewing angles of negative magnitudes to which tile data structures correspond.

9. The medium of claim 1 in which the plural respective views are within only one angular dimension.

10. The medium of claim 9 in which the one angular dimension is a horizontal angular dimension corresponding to angles within a horizontal imaging plane.

11. The medium of claim 1 in which the plural respective views are within only two angular dimensions.

12. The medium of claim 11 in which the two angular dimensions are a horizontal angular dimension corresponding to angles within a horizontal imaging plane and a vertical angular dimension corresponding to angles within a vertical imaging plane.

13. The medium of claim 1 in which the image texture includes an outer surface and the outer surface is of the same dimensions in each of the plural respective views of the image texture.

14. The medium of claim 1 in which the plural respective views of the image texture are based upon morphings of the image texture.

15. The medium of claim 1 in which the plural respective views of the image texture are based upon manually formed renderings of the image texture.

16. A computer method of applying a texture map to an image surface in a graphics image rendered on a computer display screen, comprising:

identifying plural adjacent regions of the image surface to which regions the texture map is to be applied;

determining a user viewing angle for each of the plural regions;

correlating each viewing angle with a texture map tile corresponding to the viewing angle; and

rendering the texture map tiles simultaneously at the adjacent regions on the computer display screen to form the texture map on the image surface.

17. The computer method of claim 16 in which the texture map tile corresponding to the viewing angle for each region is one of plural predetermined texture map tiles stored in a computer memory.

18. The computer method of claim 16 in which the texture map tile corresponding to the viewing angle for each region is calculated based upon the determining of the viewing angle.

19. The computer method of claim 16 in which determining a viewing angle for each region includes determining only one viewing angle for the region corresponding to angles within only one imaging plane.

20. The computer method of claim 19 in which the one viewing angle is a horizontal viewing angle corresponding to an angle within only a horizontal imaging plane.

21. The computer method of claim 16 in which determining a viewing angle for each region includes determining two viewing angles corresponding to angles within two transverse imaging planes.

22. The computer method of claim 21 in which the two viewing angles are a horizontal viewing angle and a vertical viewing angle corresponding to angle within horizontal and vertical imaging planes, respectively.

23. The computer method of claim 16 in which determining a viewing angle for each region includes determining only one viewing angle for the region corresponding to angles within only one imaging plane.

24. The computer method of claim 16 in which the texture map tile corresponding to the viewing angle is of a predetermined tile structure and includes an oblique parallel projection of the predetermined tile structure.

25. The computer method of claim 16 in which the texture map tile corresponding to the viewing angle is of a predetermined tile structure and includes a morphing of the predetermined tile structure.

26. The computer method of claim 16 in which in which the texture map tile corresponding to the viewing angle is of a predetermined tile structure and includes a manually formed renderings of the predetermined tile structure.

27. A method of generating a tile data structure in a computer readable medium representing an image texture for a tiled texture mapping, comprising:

determining plural selected viewing angles for viewing simultaneously plural adjacent tiles of the image texture;

correlating each of the plural selected viewing angles to a predetermined range of viewing angles that includes the selected viewing angle, immediately successive predetermined viewing angle ranges being correlated to adjacent tiles of the image texture; and

forming for each of the selected viewing angles a data structure that includes plural projections of the image texture relative to the selected viewing angles of plural adjacent tiles to be viewed simultaneously.

28. The method of claim 27 in which the image texture includes a front surface with predetermined dimensions and the projections of the image texture relative to the

selected viewing angles maintains the predetermined dimensions of the front surface of the image texture.

29. The method of claim 27 in which the projections of the image texture relative to the selected viewing angles are oblique parallel projections.

30. The method of claim 27 in which the plural selected viewing angles are within only one angular dimension.

31. The method of claim 27 in which the plural selected viewing angles are within only two angular dimensions.

32. The medium of claim 27 in which the plural respective views of the image texture are based upon morphings of the image texture.

33. The medium of claim 27 in which the plural respective views of the image texture are based upon manually formed renderings of the image texture.

34. In a computer readable medium, computer software instructions for applying a texture map to an image surface in a graphics image rendered on a computer display screen, comprising:

software instructions for identifying plural adjacent regions of the image surface to which regions the texture map is to be applied;

software instructions for determining a viewing angle for each of the plural regions;

software instructions for correlating each viewing angle with a texture map tile corresponding to the viewing angle; and

software instructions for simultaneously rendering the texture map tiles corresponding to the viewing angles at the adjacent regions on the computer display screen to form the texture map on the image surface.

35. The medium of claim 34 in which the texture map tile corresponding to the viewing angle for each region is one of plural predetermined texture map tiles stored in a computer memory.

36. The medium of claim 34 in which the texture map tile corresponding to the viewing angle for each region is calculated based upon the determining of the viewing angle.

38. The medium of claim 34 in which the texture map tile corresponding to the viewing angle for each region is of a predetermined tile structure and includes a morphing of the predetermined tile structure.

39. The medium of claim 34 in which in which the texture map tile corresponding to the viewing angle for each region is of a predetermined tile structure and includes a manually formed rendering of the predetermined tile structure.